

Australian/New Zealand Standard®

Paints and related materials—Methods of test

Method 602.2: Measurement of specular gloss of non-metallic paint films at 20°, 60° and 85°

PREFACE

This Joint Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CH/3 on Paints and Related Materials. This Standard is identical with, and has been prepared from, ISO 2813:1994, *Paints and varnishes—Measurement of specular gloss of non-metallic paint films at 20°, 60° and 85°*.

The objective of this Standard is to provide methods for the measurement of the specular gloss of paint films. The method is a revision of the 1974 edition of AS 1580.602.2, Method 602.2: *Specular gloss*, and aligns it with international Standards.

For the purpose of this Standard, the text of ISO 2813 should be modified as follows:

- (a) *Terminology* The words 'this Australian/New Zealand Standard' should replace the words 'this International Standard' wherever they appear.
- (b) *Decimal marker* Substitute a point (.) for a comma (,) wherever it appears as a decimal maker.
- (c) *References* The references to International Standards should be replaced by Joint Australian/New Zealand Standards as follows:

<i>International Standard</i>		<i>Australian/New Zealand Standard</i>	
ISO		AS/NZS	
		1580	Paints and related materials— Methods of test
1512	Paints and varnishes—Sampling of productst in liquid or paste form	1580.102.1	Method 102.1: Sampling procedure
1513	Paints and varnishes—Examination and preparation of samples for testing	1580.103.1	Method 103.1: Preliminary examination and preparation for test
2808	Paints and varnishes—Determination of film thickness	1580.108.1	Method 108.1: Determination of dry film thickness on metallic
		1580.108.2	Method 108.2: Dry film thickness—Paint inspection gauge

- (d) *Add to Clause 2:*
'AS 1580.101.1, Method 101.1: Air drying conditions.'

- (e) *Add* to Clause 5.3(a) the following:

NOTE: The tolerances on the angle of the incident beam, to the perpendicular to the surface under test, are indicative only.

- (f) *Delete* from Clause 8.1.1, line 12 of the third paragraph:

‘at $23 \pm 2^\circ$ and $(50 \pm 5)\%$ relative humidity’ and *substitute* the following:

‘using the routine conditions specified in AS 1580.101.1 or, in the event of dispute, the reference conditions specified in AS 1580.101.1.’

- (g) *Add* to Clause 8.1.2 the following:

NOTE: Measurement of film thickness is not necessary once the efficacy of the draw-down technique has been proven.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the annex to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

METHOD

1 Scope

This International Standard is one of a series of standards dealing with the sampling and testing of paints, varnishes and related products.

It specifies a test method for determining the specular gloss of paint films using a reflectometer geometry of 20°, 60° or 85°. The method is not suitable for the measurement of the gloss of metallic paints.

- a) The 60° geometry is applicable to all paint films, but for very high gloss and near-matt films 20° or 85° may be more suitable.
- b) The 20° geometry, which uses a smaller receptor aperture, is intended to give improved differentiation between high-gloss paint films (i.e. films with a 60° specular gloss higher than about 70 units).
- c) The 85° geometry is intended to give improved differentiation between low-gloss paint films (i.e. films with a 60° specular gloss lower than about 10 units).

NOTES

1 The same geometry should, of course, be retained for a series of measurements even if this means disregarding the suggested limits.

2 In some cases, the determination of specular gloss may not correspond to a visual assessment.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions

of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1512:1991, *Paints and varnishes—Sampling of products in liquid or paste form*.

ISO 1513:1992, *Paints and varnishes—Examination and preparation of samples for testing*.

ISO 2808:1991, *Paints and varnishes—Determination of film thickness*.

3 Definition

For the purposes of this International Standard, the following definition applies.

3.1 specular gloss: The ratio of the luminous flux reflected from an object in the specular direction for a specified source and receptor angle to the luminous flux reflected from glass with a refractive index of 1,567 in the specular direction.

NOTE 3 To define the specular-gloss scale, polished black glass with a refractive index of 1,567 is assigned the value of 100 for geometries of 20°, 60° and 85°.

4 Required supplementary information

For any particular application, the test method specified in this International Standard needs to be completed by supplementary information. The items of supplementary information are given in annex A.

5 Apparatus

Ordinary laboratory apparatus and glassware, together with the following:

5.1 Substrate for tests where a liquid paint sample is supplied

The substrate shall be glass of mirror quality, preferably of thickness at least 3 mm and of dimensions at least 150 mm × 100 mm. The largest dimension shall be at least equal to the length of the illuminated area.

NOTE 4 Although the method as written is restricted to paints, clear varnishes may be tested by using as the substrate either black glass or clear glass roughened and covered on the back and edges by black paint.

5.2 Film applicator

A block applicator, having a recess ground from the underface to form a gap $150\ \mu\text{m} \pm 2\ \mu\text{m}$ deep when placed on an optically plane surface, or other means of applying a paint film, shall be used.

NOTE 5 The block applicator produces a wet-film thickness of approximately 75 μm .

5.3 Glossmeter

The glossmeter shall consist of a light source and a lens that directs a parallel beam of light onto the surface under test, and a receptor housing containing a lens, field stop and photoelectric cell to receive the required cone of reflected light. The glossmeter shall have the following characteristics.

a) Geometry

The axis of the incident beam shall be at $20^\circ \pm 0,1^\circ$, $60^\circ \pm 0,1^\circ$ or $85^\circ \pm 0,1^\circ$ (see table 1) to the normal to the surface under test. The axis of the receptor shall coincide with the mirror image of the axis of the incident beam to within $\pm 0,1^\circ$. With a flat piece of polished black glass or a front-reflecting mirror in the test panel position, an image of the source shall be formed at the centre of the receptor field stop (receptor window). (See figure 1 for a general indication of the essential features.) To ensure averaging over the whole surface, the width of the illuminated area of the test panel shall be significantly larger than likely surface structures: a generally accepted value is 10 mm.

The dimensions of the source image and receptor apertures and the associated tolerances shall be as indicated in table 1. The angular dimensions of the receptor field stop shall be measured from the receptor lens.

b) Filtering at the receptor

Filtering at the receptor shall be done in such a way that the transmittance of the filter $\tau(\lambda)$ is given by

$$\tau(\lambda) = k \frac{V(\lambda) S_c(\lambda)}{s(\lambda) S_s(\lambda)}$$

where

$V(\lambda)$ is the CIE photopic luminous efficiency;

$S_c(\lambda)$ is the spectral power distribution of CIE standard illuminant C;

$s(\lambda)$ is the spectral sensitivity of the receptor;

$S_s(\lambda)$ is the spectral power distribution of the illuminating source;

k is a calibration constant.

NOTE 6 The tolerances have been chosen so that errors in the source and receptor apertures will not produce reading errors of more than one gloss unit at any point on a 100-unit scale (see 5.4.1).

By agreement, CIE standard illuminant A may also be used for a transition period. This shall be stated in the test report.

c) Vignetting

There shall be no vignetting of rays that lie within the field angles specified in 5.3 a).

d) Receptor meter

The receptor measurement device shall give a reading proportional to the light flux passing the receptor field stop to within 1 % of the full-scale reading.

NOTE 7 A commonly used receptor meter arrangement uses a barrier-layer photocell in conjunction with a high-resistance galvanometer. This is not satisfactory as the galvanometer output is